



OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

Interface Beyond the Enterprise: Systems Engineering in an era of Global Technical Means

L E A D I N G I N T E L L I G E N C E I N T E G R A T I O N

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Briefing to SERC
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Overview

- Our ‘traditional’ engineering environment
- Interface drivers
- ‘Closed’ systems
- The new Global Technical Means
- Implications for ‘knowledge’ systems



A note on speaker perspective

- Not a systems engineer
 - ...but have been responsible for guiding engineers
 - ...and have worked in a commercial IT engineering company
- Social scientist by formal training
 - See technology success and adoption as highly dependant on the human context within which it is employed
 - See 'norms' within S&T communities as potential source of inertia thwarting change
- My 'system' is *the world*



Observations on the traditional Intelligence Community (IC) engineering environment vs. commercial environments

	Commercial	IC
Customers	Known + unknown – enterprise goal is grow	Known – goal is satisfy
Requirements	Known + generated – seek new demand	Known – {ceiling on resources}
Customer to developer interaction	Varies – detached to direct – developers can drive expectations	Often extremely close – immediate feedback on fail – often highly informed ‘users’
Design cycle	Months / Year	Years / Decades
Adversary?	Competitors, hackers, fraud, yes...	Yes



Resulting IC interfaces are...

- Usually –
 - Planned, documented, tested, refined, validated, revised on a schedule, etc.
- Sometimes –
 - Ad-hoc, temporary, expedient
 - But still between ‘known’ systems



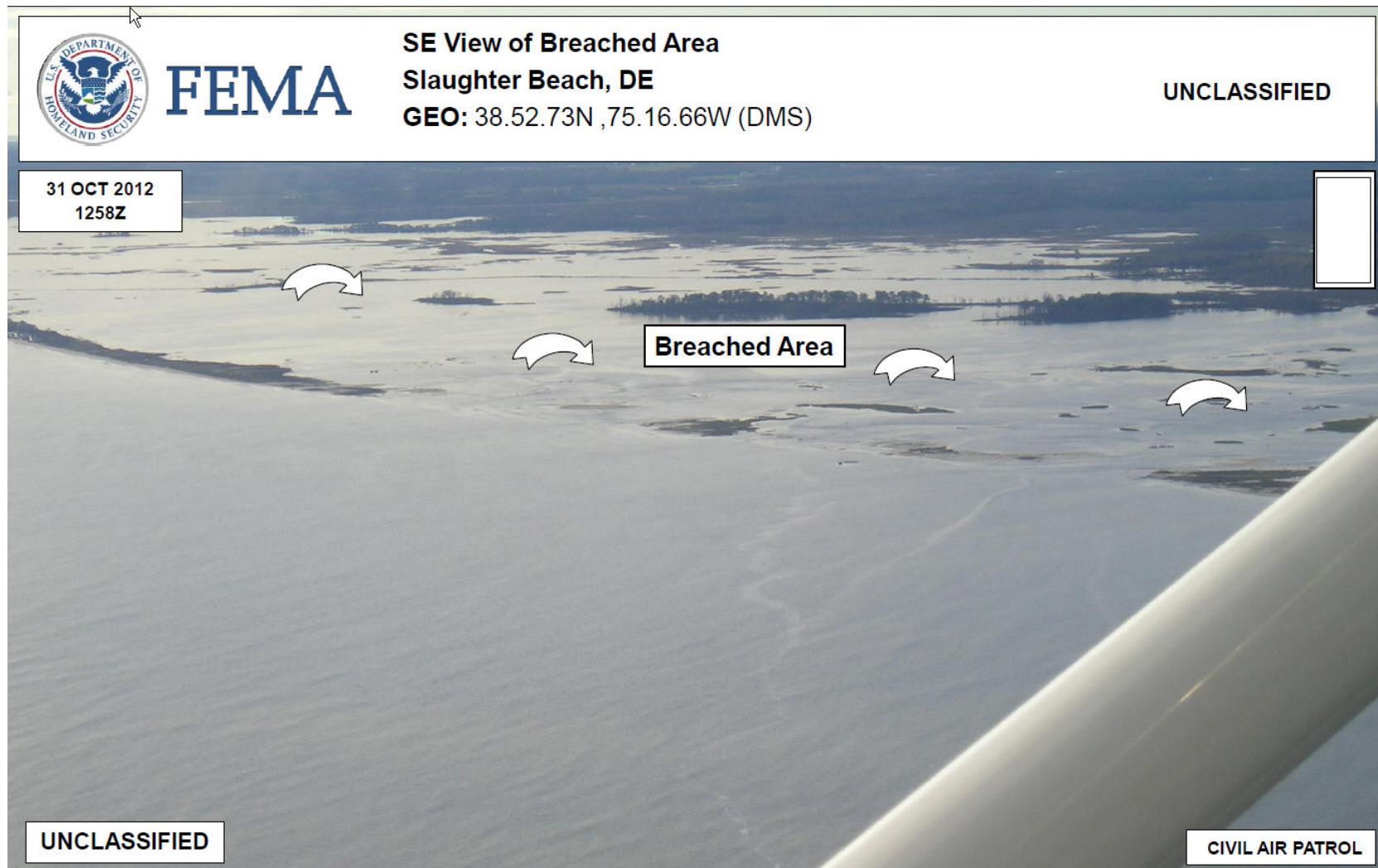
Historic interface drivers

- Laws (constitution, legislation, FAR, FCC, etc.)
- Specifications/standards (military, IC, contractual)
- Developers (known)
- Users (known)
- Environment (anticipated)
- Applications (intended)

Essentially, a closed system...



Closed systems - example





Closed systems - example

FEMA

SE View of Breached Area
Slaughter Beach, DE
GEO: 38.52.73N ,75.16.66W (DMS)

UNCLASSIFIED

31 OCT 2012
1258Z

Known 4-space {time/location}

Known sensors

Breached Area

FAA-constrained aircraft

Known operators

UNCLASSIFIED

CIVIL AIR PATROL

SCIENCE AND TECHNOLOGY

8

The image shows an aerial photograph of a flooded area with a prominent breach. Several annotations are present: a blue arrow on the left points to the text 'Known 4-space {time/location}' and 'Known sensors'; another blue arrow points to the text 'FAA-constrained aircraft'; a third blue arrow points to the text 'Known operators'. The text 'UNCLASSIFIED' appears in two locations: once in the top right corner and once in the bottom left corner of the slide. The text 'CIVIL AIR PATROL' is located in the bottom right corner. The word 'FEMA' is displayed prominently in the top left corner. The text 'SE View of Breached Area' and 'Slaughter Beach, DE' are at the top, along with the geographical coordinates 'GEO: 38.52.73N ,75.16.66W (DMS)'. The date and time '31 OCT 2012 1258Z' are in the top left. The word 'UNCLASSIFIED' is also in the top right corner. The bottom right corner contains the text 'SCIENCE AND TECHNOLOGY'. The bottom left corner contains the text '8'.



An Era of Global Technical Means (GTM)

UNCLASSIFIED

Open Source Center

Jonathan Harris and Sep Kamvar's We Feel Fine scans the blogosphere for posts containing the phrases "I feel" and "I am feeling" to construct an ever-changing portrait of the landscape of human emotion. Since 2005, over 12 million feelings have been collected, with more than 10,000 new feelings added every day.



Source: We Feel Fine

es in explosion in northwest Pakistan - website

Karachi Geo TV website in English 02 Nov 12

istani television channel Geo News website on 2 November

explosion in the Feroze Ghundi area of Hangu. Police said casualties are feared in this explosion. The explosion is not yet known.



City of Laredo

Puente de Las Americas Bridge I
Juarez-Lincoln Bridge II
Colombia Bridge III
World Trade Bridge IV

Laredo, Texas

International Bridge # 1 International Bridge # 1 International Bridge # 2 International Bridge # 2

Laredo Side



Mexico Side



Laredo Side



Mexico Side





Challenges 'interfacing' with GTM:

- Laws [compliance of external entities unknown]
- Specifications/standards [vary and dynamic]
- Developers [may be unknown]
- [Other] users [unknown]
- Environment (still may be anticipated)
- Applications [unintended]



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**Implication: require knowledge systems
with adaptable, resilient, and rapidly
reconfigurable interfaces**



Challenges 'interfacing' with GTM:

- What can systems engineering offer to
 - Our interfaces with the knowledge of the world?
 - Our internal processes to move and interpret data?
 - Our means for communicating to customers in a timely and relevant manner?



- Thank you